

Applicant: Rümpler et al.
Application No.: 10/560,372

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. – 2. (Cancelled).
3. (Currently Amended) A method according to claim [[1]] 36 wherein the enzyme granulates are removed from the processing chamber by a sifting device.
4. (Currently Amended) A method according to claim [[1]] 36 wherein the enzyme granulates are removed from the processing chamber via volumetric removal units.
5. (Currently Amended) A method according to claim [[1]] 36 wherein the enzyme granulates removed from the process that are too small or too big are separated from the finished goods.
6. (Previously presented) A method according to claim 5, wherein the enzyme granulates removed from the process that are too small are returned into the processing chamber as seed material.
7. (Previously presented) A method according to claim 5, wherein the enzyme granulates removed from the process that are too large are milled by a milling device and returned into the processing chamber as seed material.

8. (Previously presented) A method according to claim 6, wherein the enzyme granulates returned to the processing chamber are thermally retreated.

9. (Previously presented) A method according to claim 8, wherein the enzyme granulates returned into the processing chamber are dried or preheated.

10. (Previously presented) A method according to claim 8, wherein the enzyme granulates returned into the processing chamber are milled.

11. (Currently Amended) A method according to claim [[1]] 36, wherein the enzyme granulates are made from various additives and in various mixing ratios.

12. (Currently Amended) A method according to claim [[1]] 36, wherein, the material particles are subjected to a granulation process after prior spray drying.

13. (Currently Amended) A method according to claim [[1]] 36, wherein 1 % by weight or more, of a powdery ready-made granulation product, produced according to the method and/or otherwise produced enzyme particles and/or one or more enzyme containing intermediate products, selected from enzyme containing powder or dust, is added to the granulation process.

14. (Currently Amended) A method according to claim [[1]] 36, wherein the enzyme granulates produced are coated in a subsequent step by coating with a water-protecting layer.

15. (Currently Amended) A method according to claim [[1]] 36, wherein an average value of the residence time of the enzymes in the heated processing chamber amounts to less than 1.5 hours.

16. (Currently Amended) A method according to claim [[1]] 36, wherein before or simultaneously to or after step a., or during the granulation process, fine-grained to coarse particular material is added as the seed material for the drying and granulation process.

17. (Previously presented) A method according to claim ~~1, further comprising 36, wherein~~ the enzyme granulates produced, ~~having~~ have a roundness factor of 1 to 1.6, an average grain size D₅₀ of 60 to 2000 µm, (i), wherein when a content of the active enzyme in reference to a sum of active and inactive enzyme content amounts to more than 85 % up to 88%, the average grain size D₅₀ lies in the range from 650 to 2000 µm, (ii) wherein when a portion of the active enzyme, as defined above, is more than 88 % up to 91%, the average grain size D₅₀ is in the range from including 470 to less than 650 µm, (iii) wherein when the portion of the active enzyme, as defined above, is more than 91 % up to 95%, the average grain size D₅₀ is at 230, including to less than 470 µm, and (iv) wherein when the portion of the active enzyme, as defined above, amounts to more than 95 %, the average grain size D₅₀ ranges from 60 to less than 230 µm, and a residual moisture is below 5 % by weight.

18. (Previously presented) A method according to claim 17, wherein a weight ratio of inactive material including inactive enzyme in reference to active enzymes amounts to less than 7 : 1 in reference to a dry weight.

19. (Previously presented) A method according to claim 18, wherein the enzyme granulate has an average grain size of 60 through 800 µm, wherein a dust content according to the Heubach test is less than 800 ppm.

20. (Previously presented) A method according to claim 19, wherein a pressure resistance of the enzyme granulates is equal or more than 10 MPa.

21. (Previously presented) A method according to claim 20, wherein a grain size distribution of the enzyme granulates, defined by a ratio of d10/d90, is equal or greater than 0.4.

22. (Previously presented) A method according to claim 20, wherein a bulk density of the enzyme granulate is equal or greater than 500 g/l.

23. (Currently Amended) A method according to claim 17, comprising phytasis phytase as an enzyme, the phytasis phytase activity of the enzyme granulates is equal or greater than 15 000 FTU/mg.

24. (Previously presented) A method according to claim 17, further comprising using the enzyme granulates as an addition or a sole effective component in the production of formulations for food, cleaning, or pharmaceutical purposes.

25. (Previously presented) The method according to claim 24, wherein the enzyme granulate is used for the production of feed.

26. (Previously presented) The method according to claim 24, wherein the enzyme granulate is used for the production of food.

27. (Previously presented) The method according to claim 24, wherein the enzyme granulate is used for the production of a laundry or dishwashing detergent.

28. (Previously presented) The method according to claim 24, further comprising using the enzyme granulates as addition or sole effective agent in the production of formulations for food, cleaning, or pharmaceutical purposes.

29. (Previously presented) The method according to claim 28, further comprising using the enzyme granulate for the production of feed, food or a laundry or dishwashing detergent.

30. – 32. (Cancelled).

33. (Currently Amended) A method according to claim [[32]] 36, wherein one or more material nozzles and a gas for atomizing one or more solutions or suspensions of one or more inert materials are used.

34. (Currently Amended) Enzyme granulates produced according to the method of claim [[30]] 17.

35. (Currently Amended) The use of A method of using enzyme granulates according to claim 34 for the production of feed, for the production of food, or for the production of a laundry or dishwashing detergent comprising admixing the enzyme granulates to the corresponding products.

36. (New) A method for producing enzyme granulates, comprising:

a. injecting at least one liquid enzyme formulations via nozzles into a heated solids-laden processing gas stream, the processing gas stream enters a device, via at least one opening gap (1) which is rotationally symmetrical or elongated that leads into a process chamber (8) in the form of gas jets and the processing stream enters the at least one gap (1) horizontally and is redirected upwards by a deflection piece (3) into the processing chamber (8) and flows as a type of free stream into the device;

b. subjecting moistened solids in the heated gas stream to a drying and granulation process;

c. separating the particles from the gas stream after a residence time, and returning the particles into a processing chamber, where in an upper region of the processing chamber (8) and in an expansion zone (14) located above the processing chamber (8), gas speed reduces so that upward flowing particles fall laterally out of the gas stream (23) and fall back into the processing chamber (8), which is limited in a lower region by sloped lateral walls (29) defining a lateral incline, and by the effect of gravity and the lateral incline via a return zone (24) move towards the at least one gas entry gap (1),

d. directing the particles into the at least one gas entry gap where they are subsequently entrained once more by the processing gas into the processing chamber (8);

e. separating fine particles, dust, and particles from the particles entrained by the processing gas are and returning the fine particles, dust and particles to the process as seed material for granulate formation,

f. forming a circular flow of solid matter, through material return into the gas stream, arranged in an axial direction of the reaction chamber;

g. adding at least one inert material as an addition into an enzyme granulate matrix or parts therefrom for diluting the enzyme, wherein the at least one inert

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material is added in at least one of: solutions, suspensions or melts, which is separate from the resulting enzyme solution, and

h. atomizing the at least one inert material via at least one inert material atomizing nozzle that is separate from at least one liquid enzyme atomizing nozzle for atomizing the liquid enzyme formulation during the drying and granulation process.

37. (New) The method of claim 36, wherein the solutions, suspensions or melts separate from the enzyme solutions are injected via a three way nozzle or a four way nozzle.